

## 09-06-2017 11:03:00 AM

5      1. Field of the Invention

## 2. Description of the Related Art

20       Because print data is stored in the memory of the  
printer, the user can reprint the print data without having  
to resend the print data from the client device to the  
printer. Because the memory of the printer can store a  
plurality of print data sets, the user needs to select a  
25       desired one of the plurality of print data sets stored in  
the memory of the printer. In order to enable the user to







and a printer engine that prints out only the at least one of the plurality of pages selected by the user.

Further, there is provide a method of controlling a print system including a client device dealing with print data and a print control device connected to the client device. The method includes the steps of a) setting related data for the print data, b) transmitting the related data and the print data from the client device to the print control device, c) storing the related data and the print data in correspondence with each other into a memory of the print control device, d) outputting the related data stored in the memory when requested by a user.

There is also provided a medium storing programs used in a print system including a client device and a print control device connected to the client device. The programs includes the programs of a) setting related data to the print data, b) transmitting the related data and the print data from the client device to the print control device, c) storing the related data and the print data in correspondence with each other into a memory of the print control device, and d) outputting the related data stored in the memory when requested by a user.

#### BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

Fig. 1 is a block diagram showing a print system



11;

Fig. 13 is a flowchart representing reprint processes executed in a printer of the print system of Fig. 11;

Fig. 14 is a view showing a screen displayed on a display portion of the computer of Fig. 11; and

Fig. 15 is a view showing a screen displayed on the display portion of the computer of Fig. 11.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Next, preferred embodiments of the present invention will be described while referring to the accompanying drawings.

First, a print system according to a first embodiment of the present invention will be described while referring to Figs. 1 to 6. As shown in Fig. 1, the print system includes a network printer 30 and a client device 40 connected via a network W. It should be noted that a plurality of client devices 40 can be connected to the network W. However, in order to facilitate explanation, only a single client device 40 is shown in Fig. 1.

As shown in Fig. 1, the network printer 30 includes a central processing unit (CPU) 31, a read only memory (ROM) 32, a random access memory (RAM) 33, a hard disk 34, a display portion 35, an input portion 36, an interface 37, and a printer engine 38. The interface 37 of the network printer 30 is connected to the network W.

The CPU 31 performs overall control of the network printer 30 and also executes various control programs. The ROM 32 stores a print control program and various parameters as fixed data. The RAM 33 temporarily stores programs and data required for various processes. The RAM 33 also temporarily stores print data and related data transmitted from the client device 40. Details for the related data will be described later.

The hard disk 34 is a memory mainly for storing print data and related data transmitted from the client device 40. The hard disk 34 includes a print data storage region 34a and a related data storage region 34b. The print data storage region 34a stores a plurality of print data sets in order for each print job. The related data storage region 34b stores a plurality of related data sets in correspondence with the print data sets.

A conversion process, such as bitmap development process, is performed for print data before the print data is stored in the print data storage region 34a. The conversion process is for converting the print data into a format that the printer engine 38 uses when printing. Alternatively, the print data can be stored in the print data storage region 34a without its format being converted. In this case, the conversion process is performed when print processes are performed for the print data.





for example, work data for a variety of programs. The memory 44 is a rewritable memory, such as hard disk. A variety of application software are installed in the memory 44.

5           The display portion 45 displays data, such as image data and related data. The display portion 45 can be a cathode ray tube (CRT) or a liquid crystal display (LCD) for example. The input portion 26 is for inputting data required for processes in the client device 40. The input

10           portion 26 can be a key board, for example.

The interface 47 transmits data to the printer 30 and receives data from the printer 30 across the network W.

Next, processes performed by the print system according to the present embodiment will be described while referring to Figs. 2 to 4.

Fig. 2 is a flowchart representing the processes performed by the client device 40. First in S1, print data is prepared by using a predetermined application software in the client device 40. It should be noted that print data which has already been prepared can be used in S1 and the following processes.

Next, in S2 and S3, related data relating to the print data is prepared. The related data includes one or more related image data sets, which indicate related images, and a variety of different types of management data.





between the related data and the print data, and also the representative image is clarified.

Next in S14, the print data is stored in the print data storage region 34a of the hard disk 34. Then, in S15, print operations are performed on the print data if the print command is received along with the print data. Print operations will not be performed unless a print command is received. Then, the routine is ended.

Next, relating data output processes performed in the printer 30 will be described while referring to the flowchart in Fig. 4. The process in Fig. 4 is automatically repeatedly executed at a predetermined timing as long as related data is stored in the related data storage region 34a.

First, the CPU 31 judges whether or not a related data display command has been received. The related data display command is for requesting the printer 30 to display the related data stored in the hard disk 34. The related data display command can be inputted by a user through either the input portion 36 of the printer 30 or the input portion 46 of the client device 40. If the related data display command is inputted through the input portion 46 of the client device 40, then the related data display command is transmitted from the client device 40 to the printer 30.

If a related data display command has been received

(S16:YES), then in S17, the related data stored in the related data storage region 34b is displayed on the display portion 35. Then, the process proceeds to S18. On the other hand, if not (S16:NO), then the process proceeds directly to S18. It should be noted that the display in S17 can be performed using the display portion 45 of the client device 40. In this case, the related data is transmitted from the network printer 30 to the client device 40.

In S18, the CPU 31 judges whether or not a related data print command has been received. The related data print command is for requesting the printer 30 to print out the related data. The related data print command is inputted by the user through either the input portion 36 or the input portion 46. When the related data print command is inputted through the input portion 46 of the client device 40, the command is transmitted from the client device 40 to the network printer 30.

If the related data print command has been received (S18:YES), then in S19, the related data is printed on a sheet using the printer engine 38, and the present routine is ended. On the other hand, if not (S18:NO), S19 is skipped and the present routine is ended.

Next, examples of related data screens displayed in S17 will be described while referring to Figs. 5 and 6. In the example of Fig. 5, a screen 70 displays all

representative images stored in the related data storage region 34a, each designated for a corresponding print data set stored in the print data storage region 34a. The screen 70 also displays corresponding management information next to the representative images. In this example, the management information includes a user name, a data ID, a storage date, and a total page number.

A scroll bar 71 is disposed at the right edge of the screen 70. The amount of information that can be displayed on the screen 70 is restricted by the size of the screen 70. In the example of Fig. 5, the screen 70 displays representative images and manage information for only three print data sets at the same time. However, by scrolling the screen 70 using the scroll bar 71, representative images and management information for the rest of the print data sets can be displayed as well.

A page changing button 72 and a print button 73 are disposed at a lower edge of the screen 70. Each time the page changing button 72 is pressed by the user, the screen 70 displays different ones of the related images of currently selected print data set. A print data set can be selected by the user clicking on its representative image using a mouse, for example. When the user presses the print button 73, the printer engine 38 prints out the representative images and management information of either

all or selected ones of the print data sets stored in the hard disk 34.

In the example of Fig. 6, a screen 80 displays all related image and management information of the selected one  
5 of the print data sets stored in the hard disk 34.

A print job switching button 81 and a print button 82 are disposed at a lower edge of the screen 80. The print job switching button 81 is for switching the screen to display the related images and management information of the  
10 next print data set. For example, when the job switching button 81 is pressed in the situation shown in Fig. 6, then the screen will be switched to display all related images and management information for a data set "DATA B", which is the print data set following a data set "DATA A". The print  
15 button 82 is a button for printing out all related images and management information designated for the currently displayed print data set.

In the example of Fig. 6, the screen 80 displays all five related images of the data set "DATA A". However, when  
20 a print data set includes more than five pages, then a scroll bar is displayed so that sixth page and more can be displayed by scrolling beyond the fifth page.

It should be noted that the related data screen is not limited to the examples of Figs. 5 and 6. For example, a  
25 plurality of related images and management information for a









a print control program. The printer 10 interprets information from the computer 60 and also performs print processes to be described below by executing the print control program.

5 As shown in Fig. 8, the reprint switch 16, the operation switch 19, and the display portion 20 are disposed on an upper panel portion of the printer 10. In this example, the display portion 20 is for displaying 16 characters. The user can select a desired print job or a  
10 desired page by operating on the operation switch 16.

Each printer 10 is provided with the NIC 1 and connected to the network W in a hardware hierarchy. The NIC 1 is connected to the printer 10 through a connection line 9, which is connected to the bus 14. The NIC 1 is provided with  
15 a transceiver 2, a RAM controller 3, and a bus 4.

Each NIC 1 is allotted a different IP address, which serves as distinction data. The printer 60 transmits a command with a particular IP address so that the command is transmitted to a desired one of the printers 10 connected to  
20 the NIC 1.

Next, a reprint process executed in the printer 10 according to the present embodiment will be described while referring to the flowcharts in Figs. 9 and 10.

The reprint process is usually executed after  
25 performing normal print operations. In this example, it is





routine proceeds to S27.

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5 The page selection processes executed in S25 will be described while referring to the flowchart of Fig. 10. First, in S30, the CPU 11 controls the display portion 20 to display a message urging the user to indicate whether he or she wishes to select a particular page of the selected job. If the user indicates through the operation switch 19 that he or she does not wish to select a particular page (S30:NO), then in S37, the CPU 11 retrieves print data for all pages  
10 of the selected print job from the hard disk 18, and updates the content of the reprint page table so as to register the print data into the reprint page table. At this time also, if the exact same print data is currently stored in the reprint page table, then it is unnecessary to update the  
15 content of the reprint page table. Then, the routine is ended.

On the other hand, if the user indicates he or she wishes to select a particular page of the selected print job (S30:YES), then in S31, the CPU 11 clears the reprint page  
20 table. Next, in S32, the user selects a desired page of the print job and inputs the page number of the desired page. Because the reprint process is usually performed after a normal printout operation, the user will normally have all printed pages, so the user can select the desired page while  
25 freely referring to these printed pages.







management data and related image data can be prepared at the computer 60 and then stored in correspondence with the print data in the hard disk 18 of the printer 10. By displaying or outputting the related data in accordance with the needs of the user, then the job selection of S23 and page selection of S25 can be more easily performed. Because the related data that has already been stored can be effectively used, the user can visually confirm the print data in a short period of time in order to facilitate a selection of the print data. Therefore, the print processes are more efficient. In this case, it is desirable that the printer be provided with the display portion large enough to display the screen 70, 80 shown in Fig. 5. 6.

Next, a third embodiment of the present invention will be described while referring to Figs. 11 to 15. It should be noted that components that are common to both the second and third embodiments will be assigned with the same numbering and their explanation will be omitted.

The present embodiment describes the present invention applied to a print system with a host computer and a printer connected by a network wherein the network is managed by World Wide Web (WWW) protocol. The WWW protocol is used in an information network that access to a variety of information by building a program called hyper text on the network.

Here, brief outline for the WWW protocol will be described. WWW is an information system for managing a network managing information of a variety of terminal devices, such as printers, in a unified manner at another computer. The computer is installed with a program called a WWW browser, which enables the computer to serially browse setting conditions for each terminal device one at a time. The computer the such information to control the network.

In each of these terminal devices, images, and character information are expressed using hypertext. Hypertext program uses a language called hypertext markup language (HTML). A hyper text transfer protocol (HTTP) is used as a protocol for communicating between the computers and terminal devices.

In the present embodiment, a common gateway interface (CGI) 12a is installed as a program in the ROM 12 of the printer 10 as shown in Fig. 11. The CGI 12a configures HTML that corresponds to a command from the computer 60 and interprets information called form which is generally transmitted from the computer 60. For example, when the user of the computer 60 sets the number of sheets to be printed to 5, the computer 60 will transmit the form "COPIES=5" to the CGI 12a of the printer 10.

Each computer 60 and printer 10 is assigned with distinction information called a uniform resource locator





In S44, the user selects one of thumbnails 110a to 110c of a desired print job, and then the user clicks on the print button 103. In this example, it is assumed that the thumbnail 110a of a data set "DATA A" is selected and then the print button 103 is clicked. Then in S45, as shown in Fig. 15, a page display screen 120 displays all related images of the data set "DATA A" as thumbnails 111a to 115a along with the management information of the data set "DATA A". Referring to the display screen 120, the user selects pages that he or she wishes to reprint by clicking on corresponding thumbnails one at a time. It should be noted that the selected pages will be reprinted later on in the order in which the user selects them in S45. If the page display screen 120 cannot display all of the related images at one time, then a scroll bar can be provided in the same manner as in the display screen 100 of Fig. 14.

If the user clicks on the next job button 121, then, all related images of the next job, that is, the data set "DATA B" in this example, will be displayed on the page display screen 120.

After the user selected desired pages in the manner described above, the user clicks on the print button 122. Then, the routine proceeds to S46, wherein the CPU 50 transmits a reprint command to the printer 10. At the same time, data ID and selected page numbers of the selected job



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